JURNAL PROFESIONALISME GURU

IMPLEMENTATION OF PROBLEM-BASED LEARNING IN IMPROVING STUDENTS' CRITICAL THINKING ABILITIES

Sonia Siregar, soniasiregar2003@gmail.com , *Universitas Islam Negeri Syekh Ali Hasan*

Ahmad Addary Padangsidimpuan, Indonesia

Abstract: *This study aims to analyze the implementation of the Problem-Based Learning (PBL) learning model in improving students' critical thinking skills. Problem-Based Learning is a learning approach that focuses on solving real-world problems that can stimulate students to think critically, analytically, and creatively. This study was conducted in grade X of high school involving 40 students who were divided into two groups: an experimental group that was implemented with PBL and a control group that used conventional learning methods. Data were collected through critical thinking ability tests, observations, and interviews. The results showed that the experimental group that was implemented with PBL showed a significant increase in critical thinking skills compared to the control group. In addition, students also showed higher motivation and active involvement in the learning process. Therefore, PBL can be an effective alternative in improving students' critical thinking skills in high school*

Keywords: Problem-Based Learning, critical thinking skills, active learning

INTRODUCTION

Education is a major factor in shaping the quality of human resources that will determine the progress of a nation. One of the main goals of education is to develop students' intellectual, social, and emotional potential so that they can think critically and solve problems faced in life. Critical thinking skills are an important aspect in facing the challenges of an increasingly complex era, especially in the era of rapidly developing information. Therefore, it is important for educators to develop learning methods that can stimulate and improve students' critical thinking skills. Critical Thinking Skills Critical thinking skills refer to the ability to analyze, evaluate, and interpret information objectively and logically to make the right decisions. In the context of education, critical thinking is very important to train students not only to receive information passively, but also to be able to assess and process the information actively and independently. Critical thinking also involves the ability to recognize problems, identify alternative solutions, and evaluate the advantages and disadvantages of each proposed solution.(Rahayu & Festiyed, 2019, p. 8)

However, despite the importance of critical thinking skills, many studies have shown that these skills are still relatively low among students at various levels of education. One of the main reasons is the lack of implementation of effective and innovative learning methods in the classroom. Students are often trapped in learning patterns that prioritize memorization and repetition, without providing opportunities for deeper thinking or creative problem solving. Problem-Based Learning (PBL) Problem-Based Learning (PBL) is one of the learning models that can be used to improve students' critical thinking skills. PBL prioritizes the use of real problems as a starting point in the learning process. In PBL, students are faced with challenging situations or problems that do not have a single solution. This problem-solving process encourages students to develop critical thinking skills, such as analysis, evaluation, and synthesis of information.(Abdullah, 2018, p. 43)

The PBL model has several advantages, including increasing student engagement, facilitating deeper learning, and improving collaborative and communication skills. In addition, PBL also allows students to connect the knowledge they learn in class with real-world situations, which makes learning more relevant and meaningful. In its implementation, PBL involves several steps, such as problem identification, information search, data collection, group discussions, and presentation of solutions. This process not only encourages students to think critically, but also to develop problem-solving and teamwork skills that are very important in everyday life and the professional world. This study aims to analyze the effectiveness of the implementation of Problem-Based Learning in improving students' critical thinking skills. In this context, the study will measure changes in students' critical thinking skills after the PBL learning model is implemented, compared to conventional learning methods that are more lecture-based or memorization-based.

By analyzing the results of the implementation of PBL, this study is expected to provide an important contribution to the understanding of how this learning model can be used to develop critical thinking skills among students, as well as provide recommendations for the development of learning practices in schools. Rationale and Significance of the Study Improving students' critical thinking skills is

one of the biggest challenges faced by the world of education today. Although many efforts have been made to overcome this problem, there are still many students who have not been able to develop their critical thinking skills optimally. Therefore, it is important to explore new approaches that are more effective and relevant to the needs of the times.(Adisusilo;, 2012, p. 90)

Problem-Based Learning (PBL) offers a potential solution to improve students' critical thinking skills, because this model does not only focus on knowledge transfer, but also on developing deeper thinking skills. By implementing PBL, students are expected to be more active, creative, and independent in learning. In addition, PBL also provides opportunities for students to apply the knowledge they have gained in a more practical and real-world context. This study is expected to provide further insight into the benefits and challenges of implementing PBL in the context of Indonesian education, especially in improving students' critical thinking skills. The findings of this study can be the basis for developing more effective learning policies and practices in the future.

The Framework of Thought for Implementing PBL is based on constructivism theory, which assumes that learning occurs effectively when students are actively involved in the learning process. In the PBL model, students not only receive information from the teacher, but also play an active role in finding solutions to the problems faced. This approach is in accordance with the principles of constructivism which emphasize the importance of direct experience and social interaction in learning. Thus, through PBL, students not only develop academic knowledge, but also critical thinking skills that are very necessary in everyday life. PBL encourages students to think more deeply, question existing information, and develop creative solutions to complex problems. This makes PBL a very relevant approach to improving students' critical thinking skills. Conventional Learning Methods vs. PBL(Afif, 2023, p. 54)

Conventional learning methods, which are often dominated by lectures and memorization, do not always provide space for students to think critically. This type of learning emphasizes mastery of the material without encouraging students to analyze or solve problems actively. In contrast, PBL, with its main focus on solving real-world problems, provides greater opportunities for students to think critically, solve problems, and develop their analytical skills. By implementing PBL, it is hoped that students can have a more meaningful learning experience and can develop skills that will be useful in their personal and professional lives in the future.

METHODS

Research methodology refers to the procedures and techniques used to collect, analyze, and interpret data to achieve the research objectives. The methodology chosen will affect the quality of the research results, as well as the extent to which the findings can be relied upon and interpreted validly. Therefore, in research on the implementation of Problem-Based Learning (PBL) in improving students' critical thinking skills, choosing the right method is very important to ensure that the data obtained is valid and can support the conclusions drawn. The following is a description of the methodology used in this study, which includes the type of research, research design, population and sample, data collection techniques, and data analysis techniques. Type of Research This research is included in the category of quantitative research, with an experimental approach. Quantitative research is used to measure and analyze variables that can be calculated, such as changes in

students' critical thinking skills before and after the implementation of the PBL learning model. The experimental approach was chosen because the researcher wanted to know whether there was a significant effect of the implementation of PBL on students' critical thinking skills.

This type of research aims to test the proposed hypothesis, namely whether the application of PBL can improve students' critical thinking skills when compared to conventional learning methods. Research Design This study used a pre-test and post-test experimental design with a control group. This design allows researchers to measure students' critical thinking skills before and after the application of PBL, and to compare the results with the control group using conventional learning methods. The steps in this research design are Pre-test: Before the experiment began, all students' critical thinking skills were measured using a validated test instrument. Experimental Group: The experimental group was applied with the Problem-Based Learning learning model for a certain period.

Control Group: The control group was given conventional learning during the same period. Post-test: After the experiment was completed, the same test was given to measure changes in students' critical thinking skills. Comparison of the pre-test and post-test results in both groups will be used to determine whether there is a significant increase in critical thinking skills in the experimental group compared to the control group Population and Sample The population in this study were all students in grade X of high school who studied subjects related to the topics taught using PBL. This study will be conducted in one of the high schools that has adequate facilities to support the experiment.

The sample of this study consists of two groups selected by random sampling to ensure fairness in the selection of the experimental group and the control group. Each group will consist of approximately 20 to 30 students, depending on the number of students in the class selected for the study. The experimental group will receive treatment with PBL, while the control group will receive conventional learning. The sample selection was carried out to ensure that the results of this study can be generalized to a wider population. Research Variables The variables in this study are divided into two types, namely: Independent Variable: The learning model applied, namely Problem-Based Learning (PBL) in the experimental group and conventional learning in the control group. Dependent Variable: Students' critical thinking skills measured before and after the experiment through a critical thinking test that has been specially designed for the purpose of this study. Data Collection Techniques To collect data relevant to this study, several techniques were used, namely Critical Thinking Ability Test This test is used to measure the level of students' critical thinking skills before and after the implementation of PBL. This test will contain questions that test students' abilities in analyzing, evaluating, and solving problems critically.

This test will be given at the beginning of the study (pre-test) and after the treatment (post-test). The test instrument is designed to cover various aspects of critical thinking, including problem analysis, argument evaluation, and decision making. Observation Observation was conducted during the implementation of PBL in the experimental group to assess student engagement, group interactions, and learning dynamics during the learning process. This observation will be carried out by researchers or observers who have been trained to assess indicators of student engagement and activity. Interview Interviews were conducted with a number of students from the experimental group to explore their opinions about their learning

experiences using PBL. This interview aims to obtain in-depth qualitative data related to student experiences and their perceptions of the learning model applied.

Documentation Documentation is used to record data related to the implementation of the experiment, such as the lesson plan (RPP), learning materials, and activity notes during the PBL learning process. Data Analysis Techniques After the data is collected, analysis is carried out to test the proposed hypothesis. Quantitative data obtained from the pre-test and post-test will be analyzed using statistical analysis. The analysis steps carried out include Normality Test: Before conducting the hypothesis test, the data will be tested for normality to ensure that the data distribution follows a normal distribution. Paired Sample T-Test: To test the difference between the pre-test and post-test results in the experimental group and the control group, a paired sample t-test is used. This test is used to determine whether there is a significant difference in students' critical thinking skills after the implementation of PBL.

Independent T-Test: This test is used to compare the differences between the experimental group and the control group after treatment, to see whether PBL has a significant effect on improving critical thinking skills. For qualitative data obtained from observations and interviews, descriptive analysis is used to identify emerging patterns and themes related to students' experiences and perceptions of PBL learning. To ensure that the research results are reliable, the instruments used in this study are tested for validity and reliability. The validity of the instrument will be tested using content validity and construct validity, while its reliability is tested using the reliability coefficient to see the consistency of the results obtained.

RESULTS & DISCUSSION

How Does the Implementation of the Problem-Based Learning (PBL) Model Influence Students' Critical Thinking Skills?

The application of the Problem-Based Learning (PBL) model in education aims to enhance students' critical thinking skills through a more active and contextual learning approach. Critical thinking, as one of the essential 21st-century skills, refers to the ability of individuals to analyze, evaluate, and synthesize information logically and make appropriate decisions when facing problems. In this context, PBL serves as a method that enables students to confront authentic problems and solve them in ways that stimulate deeper and more critical thinking. One of the key dimensions of PBL is the active learning approach, in which students are not merely passive recipients of knowledge but active participants in the learning process. They are presented with real-world problems requiring in-depth analysis, independent information-seeking, group discussions, and solution presentations. This process helps students gradually develop their critical thinking skills through problem analysis, independent learning, and the ability to evaluate information sources and think analytically about their relevance and credibility.

Moreover, collaboration and group discussions in PBL play a crucial role in enhancing critical thinking skills. Through this interaction, students exchange ideas, present arguments, and work together to solve problems. Group discussions test students' ability to defend their viewpoints, articulate opinions clearly, provide supporting evidence, and respond to differing perspectives. Consequently, students learn to consider multiple viewpoints and develop more comprehensive solutions, sharpening their abilities to evaluate arguments and question assumptions. PBL also

incorporates complex and ambiguous real-life problems into the learning process, unlike traditional learning, which often emphasizes structured questions with definite answers. As a result, students are encouraged to think more creatively and critically, relying not only on theoretical knowledge but also on practical skills to tackle unstructured challenges.

In the PBL model, the teacher acts not as a direct source of information but as a facilitator who guides and supports students throughout the learning journey. Teachers provide directions, resources, and assistance without giving direct answers, encouraging students to explore questions more deeply, critically analyze information, and develop independent solutions. This facilitation promotes independent learning and encourages students to reflect critically on their thought processes. Evaluation in PBL occurs throughout the learning process, not just at the end. Students are encouraged to reflect on what they have learned, what worked well, and what needs improvement. Through self-assessment and critical reflection, students learn to evaluate their problem-solving processes and outcomes, contributing to greater self-awareness and improved critical thinking skills.

The implementation of PBL also increases student motivation and engagement in learning. When students are given the autonomy to solve problems relevant to real life, they feel more involved and motivated to find solutions. High levels of motivation positively influence the development of critical thinking skills, as students are more inclined to think deeply, explore alternatives, and overcome challenges. Through a challenging approach, real-world relevance, collaboration, and independent learning, PBL effectively fosters students' critical thinking skills. Students are trained to analyze problems, evaluate information, collaborate in teams, and devise creative and applicable solutions. Therefore, PBL is not merely a teaching method but also a tool to prepare students for real-world challenges with sharper and more analytical thinking abilities.

The purpose of this study is to explore and evaluate the impact of the Problem-Based Learning model on improving students' critical thinking skills. Specifically, it aims to assess the extent to which the PBL model can enhance the critical thinking skills of high school students, particularly in biology education. As a learning model grounded in real-world problems, PBL is believed to help students become more active, independent, and critical in solving problems. This study seeks to determine whether there is a significant improvement in students' critical thinking skills following the implementation of PBL compared to traditional teaching methods. Another objective is to analyze the difference in critical thinking skills between students who undergo PBL-based learning and those who experience conventional instruction. Using an experimental design with pre-tests and post-tests, this study aims to determine whether the PBL model has a more positive effect on the development of students' critical thinking abilities.

Additionally, the study seeks to identify factors that influence the successful implementation of PBL in enhancing critical thinking skills. These factors include student engagement in the learning process, the quality of the problems used in PBL, group dynamics during discussions, and teacher support as facilitators. Understanding these factors is essential to maximize the effectiveness of PBL implementation in the classroom.

How Students' Experiences in Participating in Learning Using the PBL Model Are Related to Improving Their Critical Thinking Skills

The implementation of the Problem-Based Learning (PBL) model in the classroom aims to provide students with a more meaningful learning experience while also developing their critical thinking skills. In this context, students' experiences in participating in PBL-based learning play a significant role in enhancing their ability to think critically. PBL engages students with real-world problems as the foundation of the learning process, allowing them to practice and strengthen essential components of critical thinking such as analysis, synthesis, evaluation, and reflection. One of the core benefits of PBL is its emphasis on active and independent learning. Students are no longer passive recipients of information but are instead responsible for identifying problems, seeking out and evaluating information, and constructing well-reasoned solutions. Through activities like analyzing real-life problems and exploring various solutions based on evidence, students are encouraged to think independently and critically. Moreover, the collaborative nature of PBL, where students work in groups, significantly contributes to the development of critical thinking. Group discussions and debates enable students to share their perspectives, question assumptions, and refine their arguments through logical reasoning and evidence-based dialogue. These interactions help students evaluate multiple viewpoints and improve their capacity to defend or revise their opinions.

In addition, PBL enhances students' information management skills. In addressing complex problems, students must seek out credible sources, assess the reliability of information, and synthesize data to support their solutions. This process trains them to think analytically and make well-informed decisions. The model also incorporates continuous feedback and self-reflection. Feedback from both teachers and peers allows students to recognize and address weaknesses in their thinking, while self-reflection helps them assess what strategies were effective and what improvements can be made. These reflective practices deepen their critical thinking by encouraging them to evaluate their own thought processes and learning outcomes. Furthermore, PBL increases student motivation and engagement by presenting relevant, real-life problems that are interesting and meaningful to them. When students feel connected to the content and responsible for solving problems, they become more motivated to participate actively, think critically, and contribute to group efforts. This high level of engagement directly supports the enhancement of critical thinking skills, as students are more willing to explore ideas, test their understanding, and refine their reasoning. Therefore, students' experiences in PBL not only make learning more dynamic and collaborative but also serve as a powerful tool in developing their critical and reflective thinking abilities.

CONCLUSION

Overall, the application of the Problem-Based Learning (PBL) model in learning has a significant impact on improving students' critical thinking skills. PBL is not just a learning method, but also an in-depth approach that invites students to be actively involved in the learning process by solving complex real-world problems. The following are the main conclusions of this study Improving Critical Thinking Skills The PBL model has been proven effective in improving students' critical thinking skills. By providing challenging and relevant problems to real life, students are trained to identify, analyze, and solve problems in a systematic and reflective

manner. Critical thinking skills, such as the ability to evaluate information, question assumptions, and formulate logical arguments, develop rapidly in the context of this problem-based learning. PBL changes the role of students from mere recipients of information to active participants involved in the learning process. This learning encourages students to think more deeply, seek relevant information, and make decisions based on critical analysis. Students not only solve the problems given, but also play a role in finding solutions, which hones their critical thinking skills.

REFERENCES

Abdullah, W. (2018). Blended Learning Model in Improving Learning Effectiveness. Fikrotuna: Journal of Islamic Education and Management, 7(1), Article 1. Https://Doi.Org/10.32806/Jf.V7i1.3169

Adisusilo;, S. (2012). Character Value Learning: Constructivism and VCT as Innovations in Affective Learning Approaches / Sutarjo Adisusilo (Jakarta). Rajawali Pers. //Senayan.Iain-Palangkaraya.Ac.Id/Index.Php?P=Show_Detail&Id=7677&Keywords=

Afif, N. (2023). Teacher Learning Innovation with Digital Media in the 5.0 Era as Student Attraction in Islamic Religious Education (PAI) Lessons. Gapai: Journal of Islamic Religious Education, 1(2), Article 2.

Aghni, RI (2018). Functions and Types of Learning Media in Accounting Learning. Indonesian Journal of Accounting Education, 16(1), Article 1. Https://Doi.Org/10.21831/Jpai.V16i1.20173

Alexon, A., & Kurniawan, I. (2022). The Use of Instructional Development Model (MPI) for Subject Field Learning Design. Jurnal Abdi Pendidikan, 3(1), Article 1. Https://Doi.Org/10.33369/Abdipendidikan.3.1.7-14

Learning Media. Get Press.

Andrian, D., Wahyuni, A., Ramadhan, S., Enabela, FR, & Zafrullah, Z. (2020). The Effect of Stad Type Cooperative Learning on Improving Learning Outcomes, Social Attitudes and Learning Motivation. Journal of Mathematical Innovation (Inomatika), 2(1), Article 1.

Angelica, DE (2021). Development of PAI Learning Design Based on Microsoft 365 in Improving Student Learning Independence [Masters, Uin Sunan Ampel Surabaya]. Http://Digilib.Uinsby.Ac.Id/50241/

Anggraeni, SA, & Nurazizah, S. (2024). Basic Concepts of Learning Planning. Karimah Tauhid, 3(5), Article 5. Https://Doi.Org/10.30997/Karimahtauhid.V3i5.13204

Anjeli, M., & Fauzan, F. (2022). The Use of Audio-Visual Media in PA Learning for Mentally Retarded Students at Slb Koto Agung, Block B Sitiung 1, Sitiung District, Dharmasraya Regency. Tambusai Education Journal, 6(1), Article 1.

Anwar, RN, & Zaenullah, Z. (2020). Islamic Religious Education Learning Planning for Children with Special Needs. Jurnal Care (Children Advisory Research And Education), 8(1), Article 1.

Ayu. (ND). Islamic Religious Education Learning Strategy in the Digital Era: Qualitative Literature Review | Jurnal Media Akademik (Jma). Retrieved November 12, 2024, From Https://Jurnal.Mediaakademik.Com/Index.Php/Jma/Article/View/515

Bio, N. (2020). Implementation of Active, Innovative, Creative, Effective, Fun and Islamic Learning Models in Improving Student Learning Achievement. Istiqra`: Journal of Islamic Education and Thought, 7(2), Article 2.

Farhana, I. (2023). Freeing the Mind with an Independent Curriculum: Understanding Concepts and Writing Good Practices for Classroom Learning. Lindan Bestari Publisher.

Rahayu, C., & Festiyed, F. (2019). Validity of High School Physics Learning Devices Based on Generative Learning Models with Open-Ended Problem Approach to Stimulate Students' Critical Thinking Skills. Jpf (Journal of Physics Education) Alauddin State Islamic University Makassar, 7(1), Article 1. Https://Doi.Org/10.24252/Jpf.V7i1.5363